Beyond AI Detection

Designing Learning Where Thinking Remains Visible

Prof. Dr Abd Karim Alias.

Answers are now at our fingertips.

Every fact. Every formula. Every definition.
Almost instantly.

Answers are now at our fingertips.

Questions have become our *greatest advantage.*

Curiosity | Judgement | Critical Thinking | Creativity

AI DOESN'T REPLACE THINKING. IT ADDS VALUE.

AI is a powerful partner that **amplifies** human potential.

AI CAN...

- Find information faster
- Explain complex ideas
- Generate options and insights

HUMANS ADD WHAT MATTERS MOST...

- Ask better questions
- Think critically
- Make wise judgements
- Create meaningful impact

- More focus on higher-order thinking
- More time for deep learning
- More personalised learning experiences
- More creativity and innovation
- Better preparation for real-world challenges

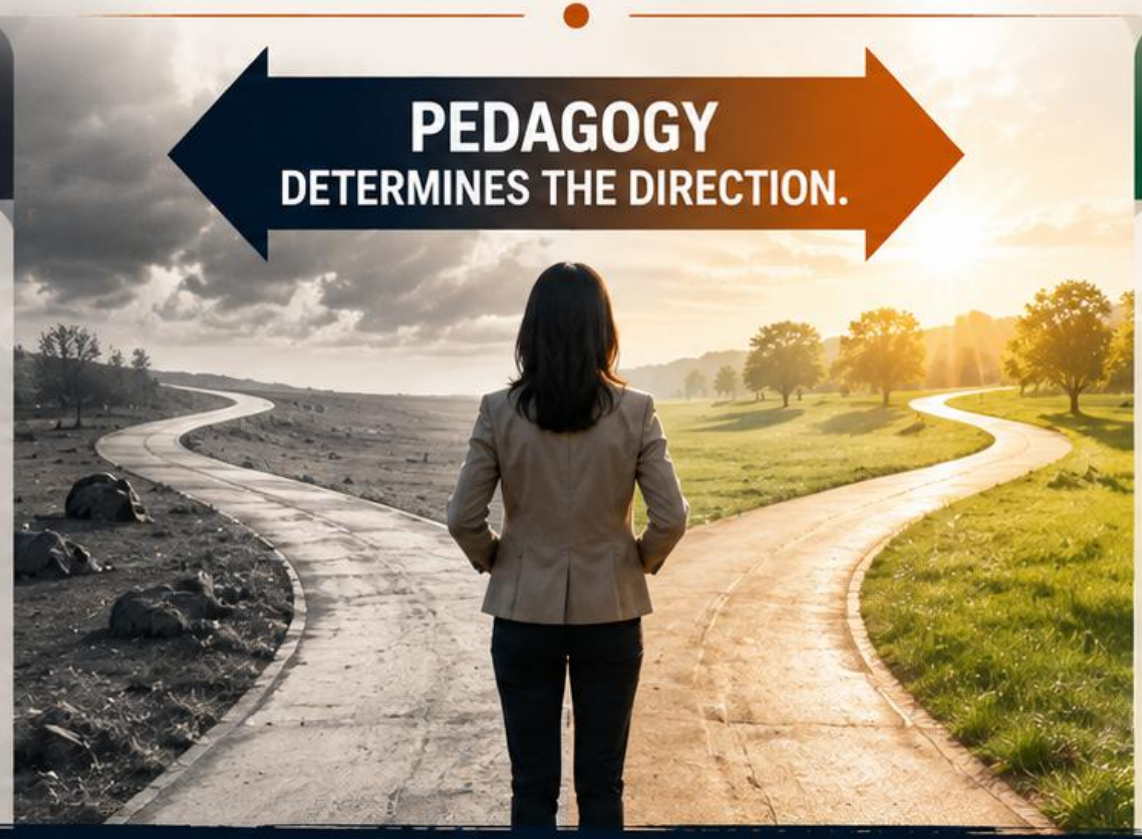
The future belongs to learners who know how to **use AI** — and **think for themselves.**

AI DOESN'T TRANSFORM LEARNING.
PEDAGOGY DOES.

AI WITHOUT PEDAGOGY

- **Faster answers**
  but shallow understanding
- **Copy & paste**
  instead of constructing
- **Cognitive offloading**
  instead of cognitive engagement
- **Surface learning**
  for short-term results

PEDAGOGY
DETERMINES THE DIRECTION.



AI WITH PEDAGOGY

- **Better questions**
  that drive deeper inquiry
- **Visible thinking**
  that builds understanding
- **Reflection**
  that develops metacognition
- **Meaningful learning**
  that connects and transfers
- **Transfer of learning**
  to real-world contexts

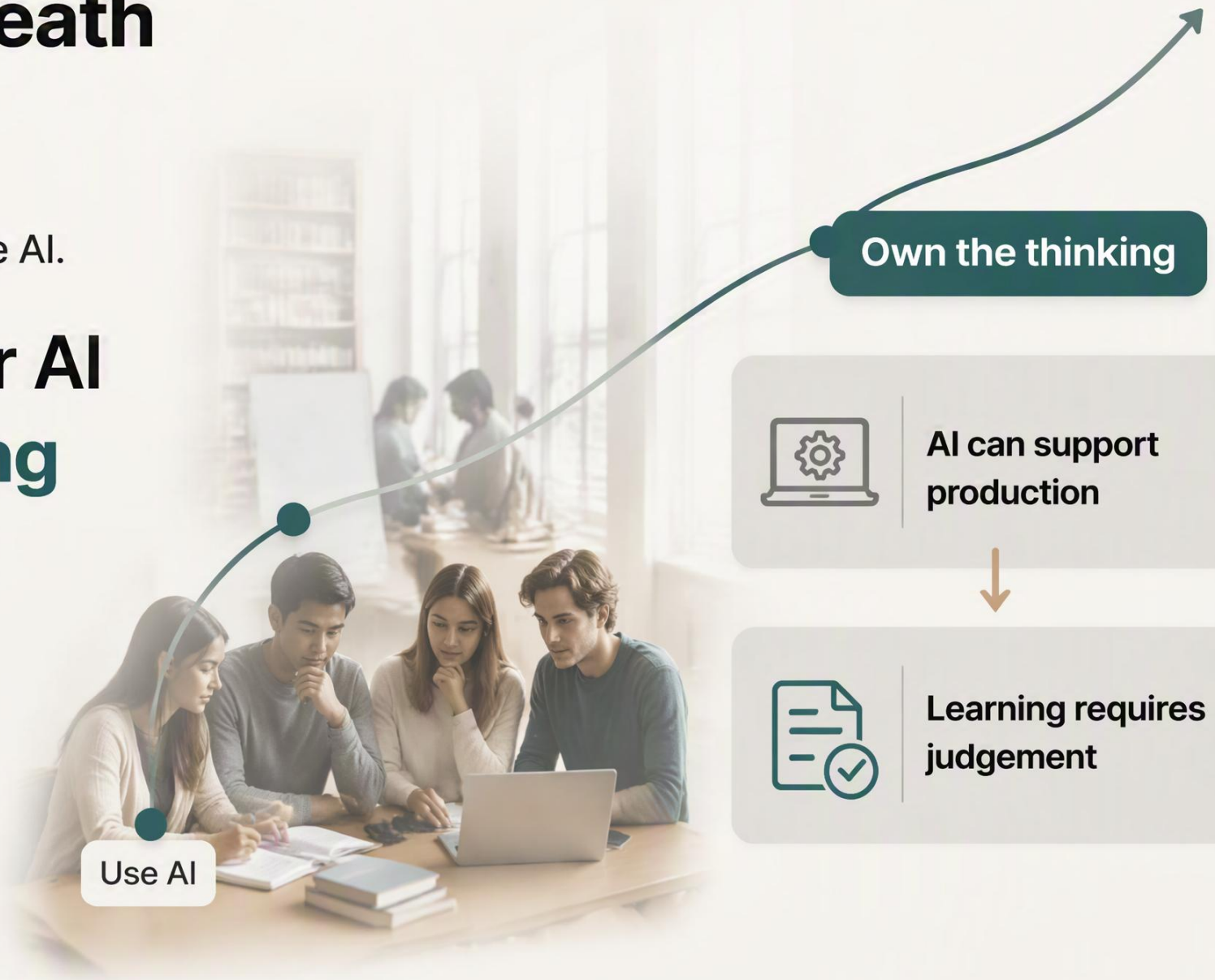
The same AI can produce shallow learning or meaningful learning.
The difference is not the technology. It is the pedagogy.

The Question Beneath Every AI Policy

The issue is not whether students use AI.

The issue is whether AI **replaces the thinking** the course is meant to develop.

Our task is to redesign learning so AI can support the work while students still own the thinking.



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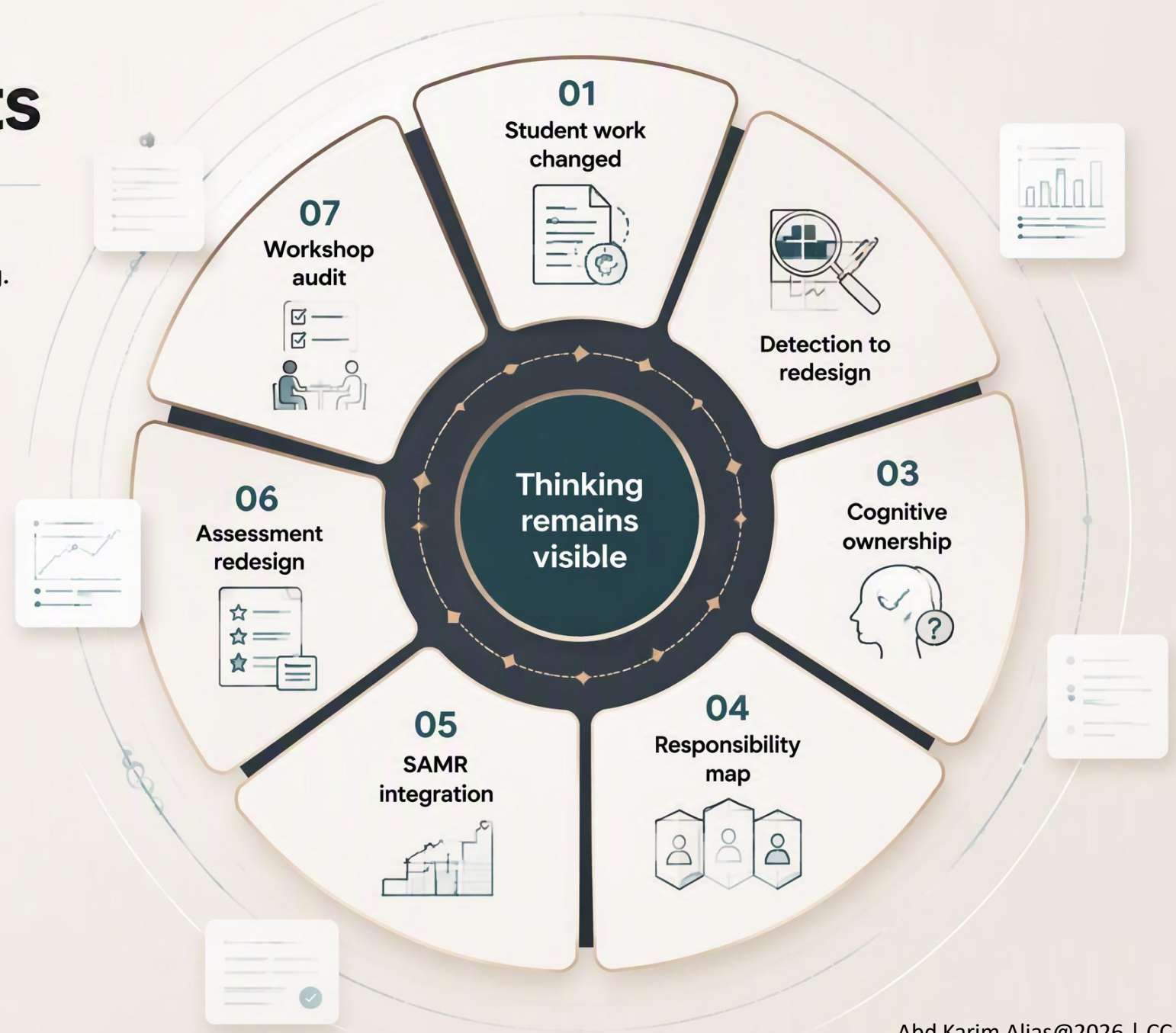
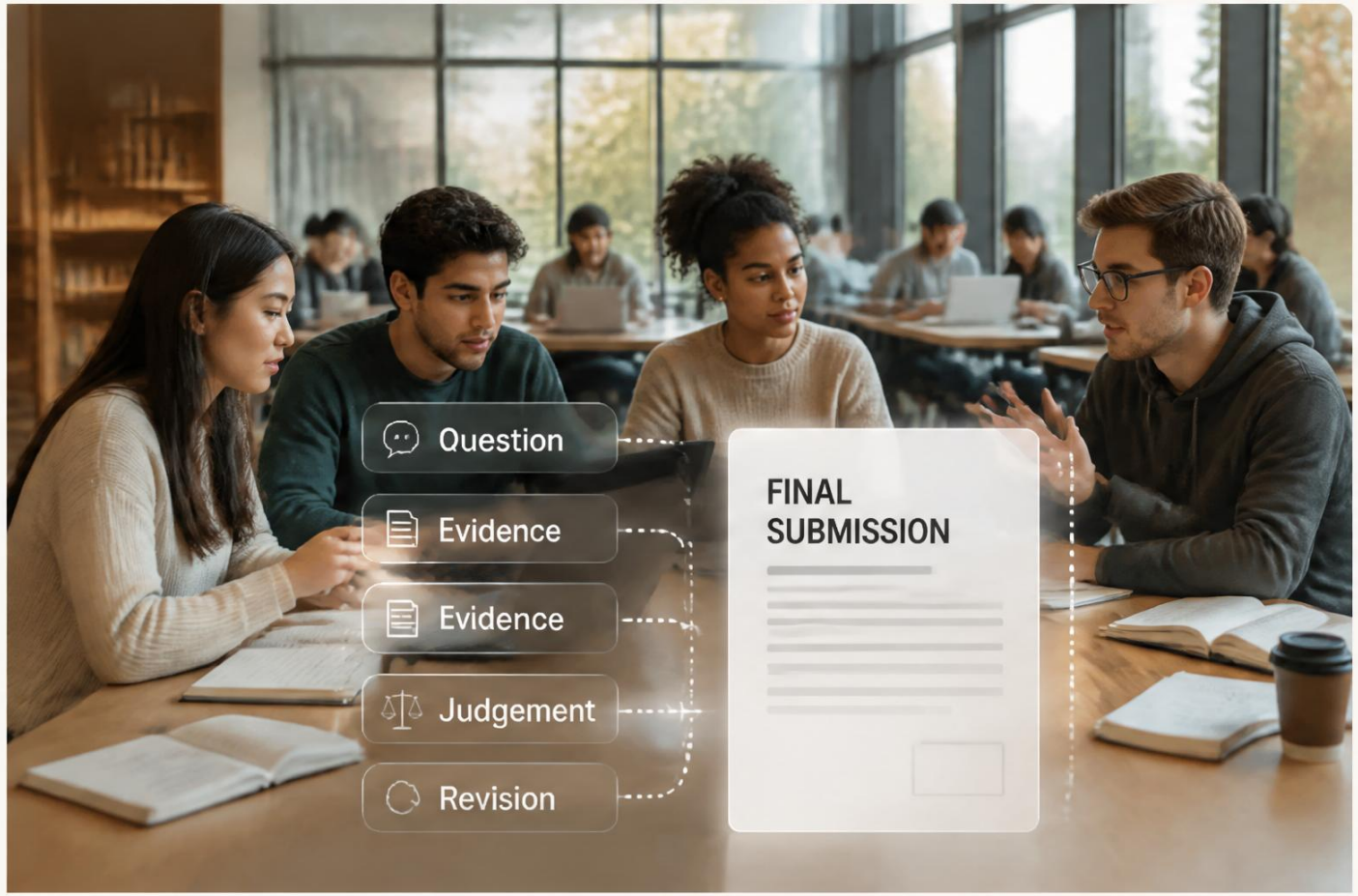


01 — WHY AI CHANGES THE MEANING OF STUDENT WORK



PRODUCT | PROCESS | LEARNING EVIDENCE

SECTION QUESTION

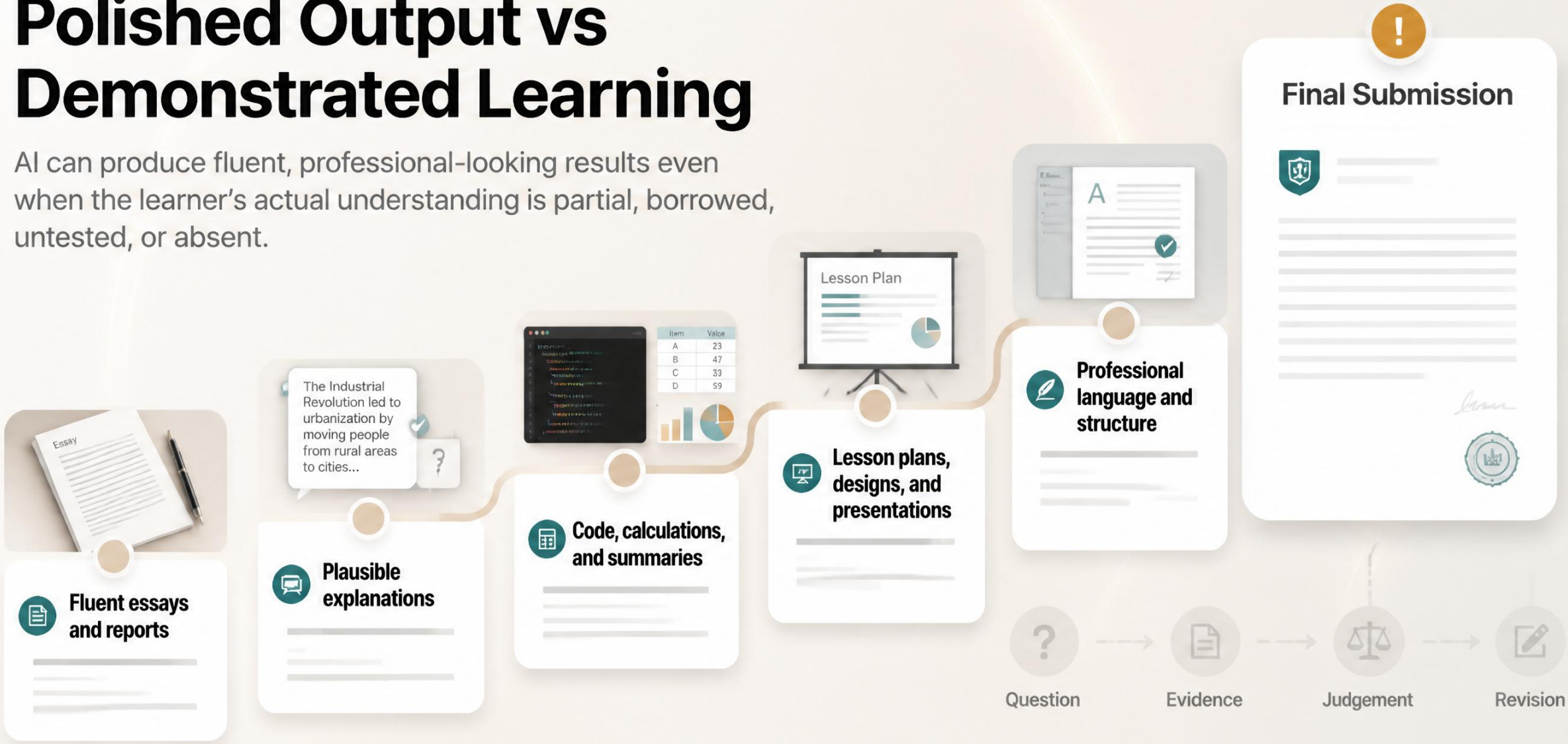
If a final product can be generated in seconds,

what does that product still prove?

Assessment must look beyond polish and ask what thinking is actually evidenced.

Polished Output vs Demonstrated Learning

AI can produce fluent, professional-looking results even when the learner's actual understanding is partial, borrowed, untested, or absent.



> The output may be polished even when the learner's understanding is partial, borrowed, untested, or absent.

Product Evidence Versus Learning Evidence

A polished submission shows an outcome; learning evidence reveals how the outcome was produced, tested, and improved.

Product evidence asks

- What was submitted?
- Is it complete and well presented?
- Does it resemble the expected genre?
- Does it satisfy surface requirements?

Learning evidence asks

- How was the problem framed?
- What knowledge was used?
- What alternatives were considered?
- What was checked, and against what?
- Why were decisions made?
- What changed through feedback and revision?
- Can the student explain and defend the work?

> A product is an outcome. **Learning evidence** reveals the thinking that produced it.

Why Detection is an Insufficient Educational Strategy

Detection may raise questions. It cannot prove learning.

Detection tools may signal

Similarity reports
textual overlap and source-matching patterns

AI detectors
probability-like language-pattern claims

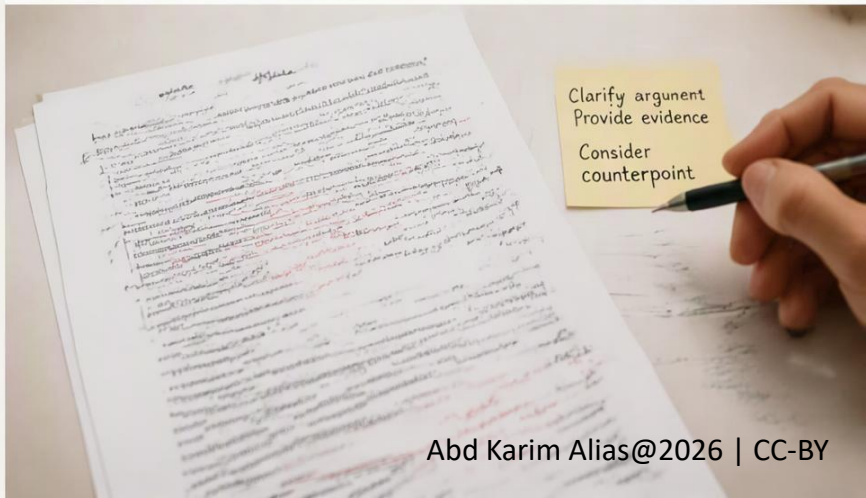
Surveillance records
access, timing, or screen activity

What can we infer?

But they cannot establish

- Meaningful learning occurred
- The student understood the content
- Judgement was exercised
- Claims and sources were verified
- The student can defend decisions

Detection can support an inquiry, but it cannot substitute for valid assessment design.



Assessment Validity in the AI Era

Does the assessment still measure the intended learning?

Three-Part Validity Check

Intended outcome

Knowledge, skill, judgement, or disposition students should develop

→

Task demand

The thinking the assessment actually requires from the student

→

Submitted evidence

What the educator can genuinely infer from the work

Warning Signs

- AI can bypass the intended thinking
- Rubric rewards polish more than reasoning
- Only the final product is visible
- Students cannot explain how or why the work changed

Evidence Quality Checklist

- [x] Aligned to intended outcome
- [x] Shows the required thinking
- [x] Sufficient transparency of process
- [x] Supports a defensible inference

When the evidence no longer supports the inference, the assessment must be redesigned.

02

Cognitive Offload, Visible Thinking, and Ownership

What should **AI carry**—and what must the **learner continue to carry**?

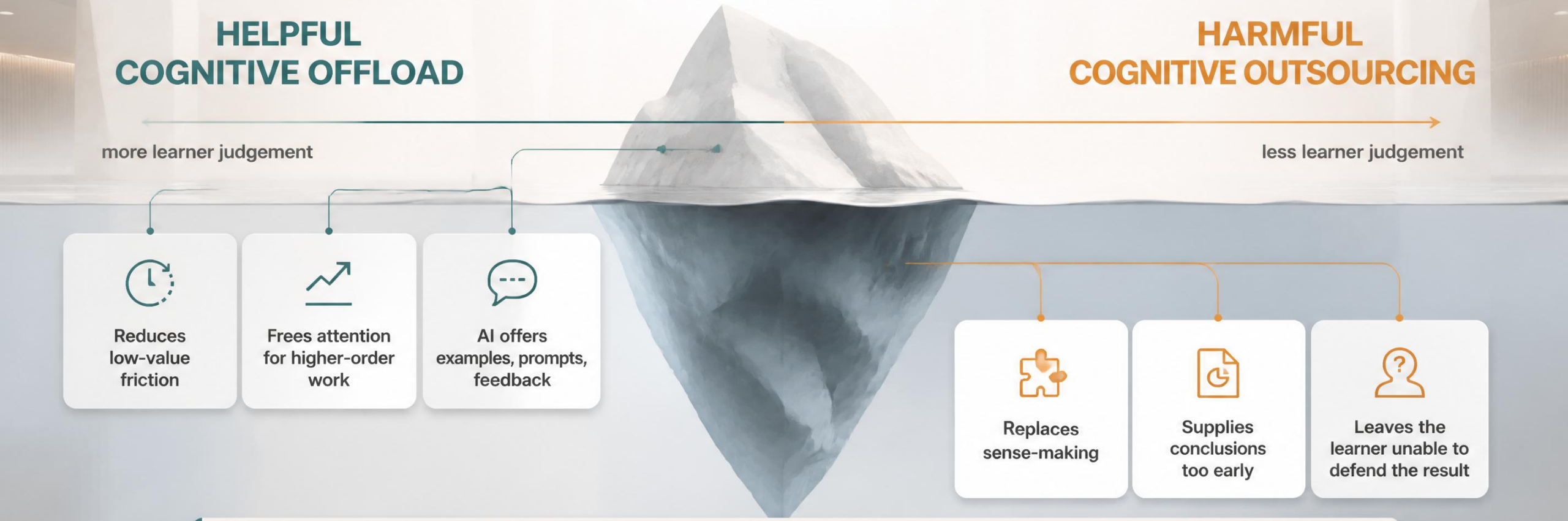
Offload
reduce friction

Visible Thinking
show reasoning

Ownership
remain answerable

Cognitive Offload or Cognitive Outsourcing?

THE DESIGN QUESTION: WHAT THINKING REMAINS WITH THE LEARNER?



HELPFUL COGNITIVE OFFLOAD

more learner judgement

- Reduces low-value friction
- Frees attention for higher-order work
- AI offers examples, prompts, feedback

HARMFUL COGNITIVE OUTSOURCING

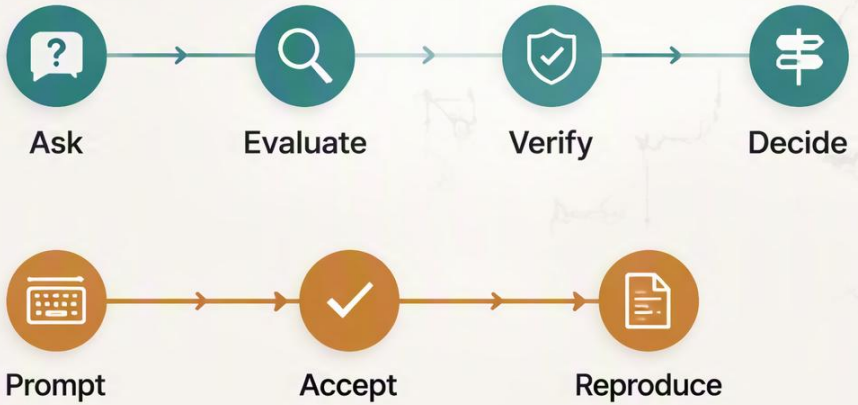
less learner judgement

- Replaces sense-making
- Supplies conclusions too early
- Leaves the learner unable to defend the result

After using AI, is the student more capable — or merely more finished?

When AI Supports Learning vs When AI Replaces Learning.

The difference is whether students evaluate, decide, and defend — or simply reproduce.



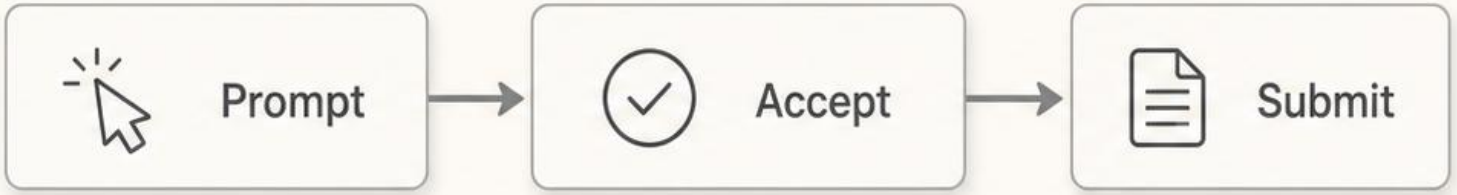
Learning purpose	AI supports learning when...	AI replaces learning when...
Understanding	It explains, questions, and offers examples the learner evaluates	It supplies an answer the learner reproduces
Writing	It helps test structure and revise clarity after an initial attempt	It authors the argument and the student makes cosmetic edits
Problem solving	It offers alternative approaches the learner compares	It selects and executes the method without student reasoning
Research	It suggests leads the learner verifies in credible sources	It becomes the unverified source
Design	It generates options the learner critiques against criteria	It makes key choices without justification

Visible thinking = evaluation before acceptance.

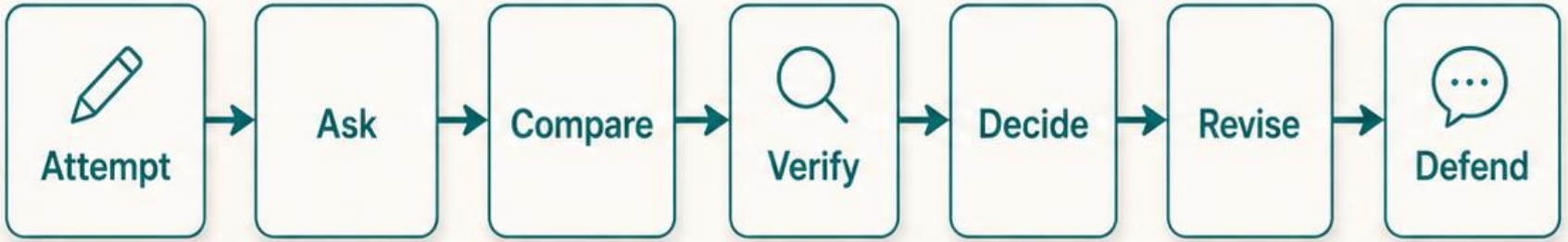
The Spectator Risk

Students can become spectators in their own education.

Passive loop



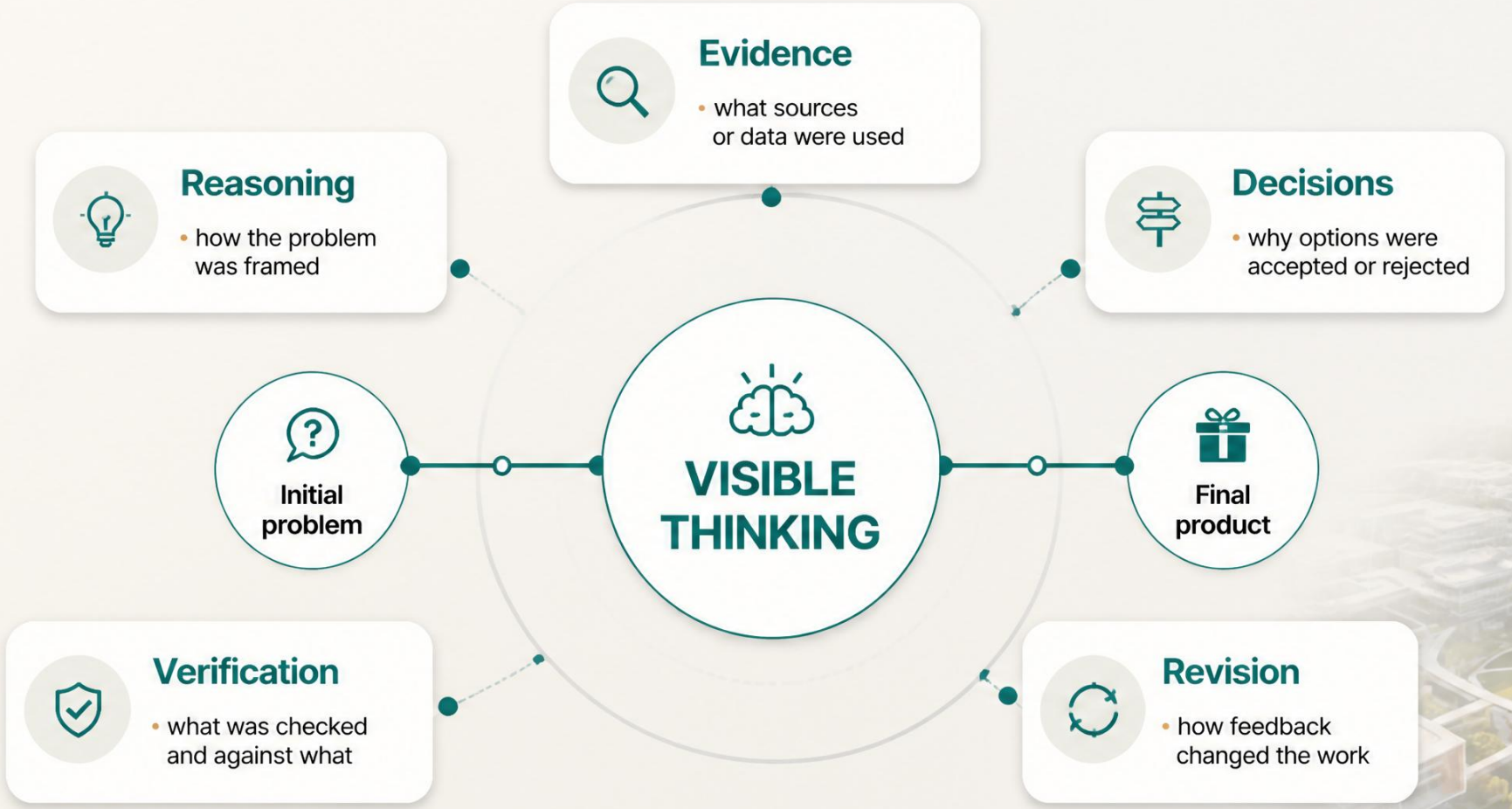
Active learning loop



Design implication

The second loop is slower, but it is where **capability, judgement,** and **ownership** are built.

Making Thinking Visible



Design tasks so students externalize the reasoning, evidence, decisions, verification, and revision that connect an initial problem to a final product.

Academic integrity is strengthened when learning becomes transparent.

A Toolkit of Visible Learning Evidence

Use process evidence to show how students framed, tested, revised, and defended their work.

Initial attempt
thinking before AI input

AI-use log
tool, purpose, prompt summary

Verification notes
checked claims, methods, sources

Decision memo
options considered and reasons

Annotated draft
changes and unresolved questions

Revision trail
feedback and improvement record

Reflection
learning about task and thinking

Oral defence / teach-back
explain, question, transfer

Select only what the learning outcome requires

Metacognition:
Helping Students Notice Their Own Thinking

Reflection should reveal decisions

AI interactions become evidence

Students remain answerable for judgement

Cognitive Responsibility as a Learning Outcome

The learner remains answerable for the framing, evidence, judgement, decisions, and consequences of the work — even when AI contributes.

Students demonstrate it when they can...

- ✓ State what they delegated and why
- ✓ Verify important claims
- ✓ Explain rejected alternatives
- ✓ Justify final decisions
- ✓ Defend the work under questioning

> **Responsible AI use is intellectual maturity, not only compliance.**

03 The Human–AI Responsibility Map

Delegate

AI may carry

Lower-stakes, routine, or procedural work with clarity.

Share

Shared with disclosure

Collaborative thinking with transparent acknowledgment.

Protect

Student must carry

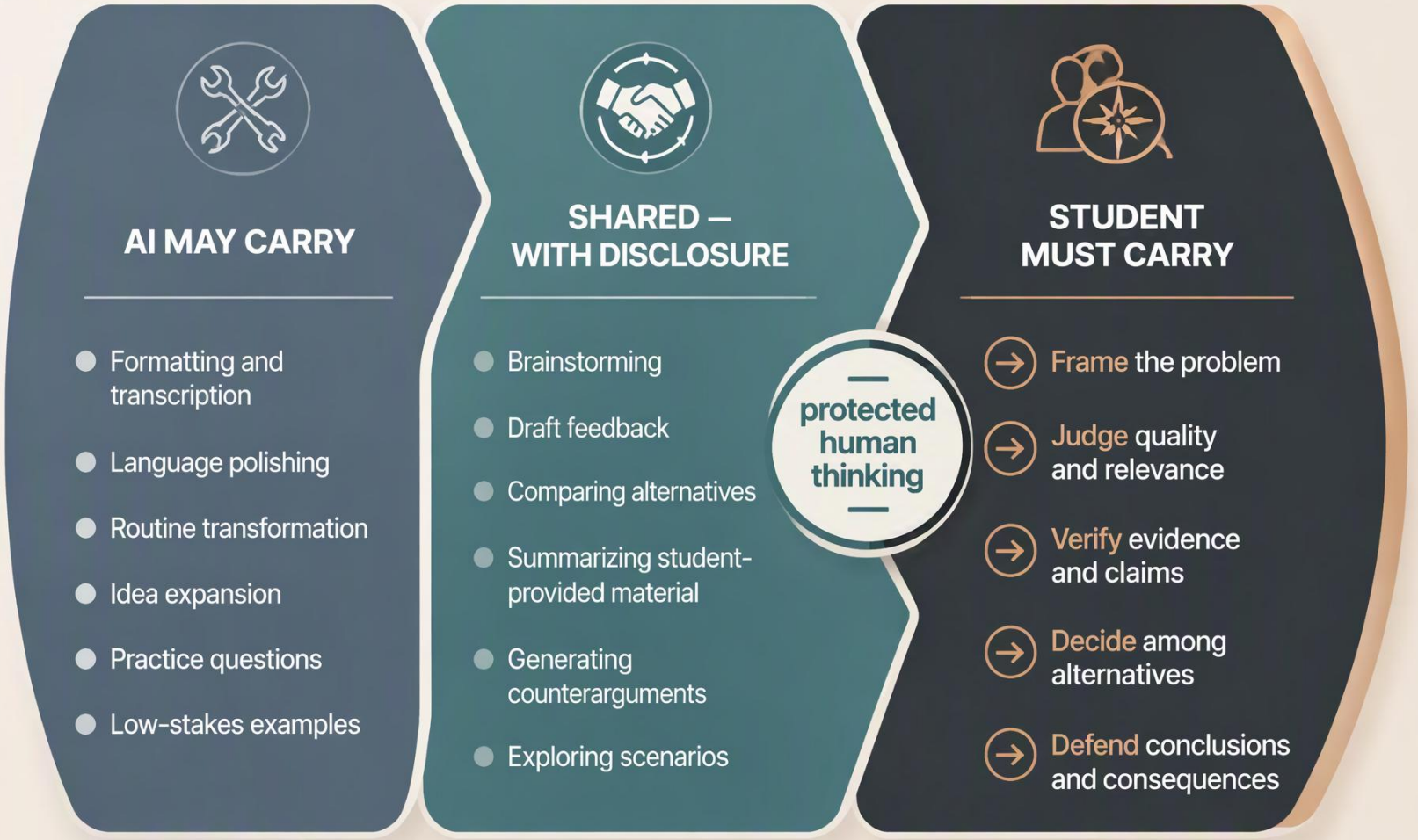
High-stakes judgment, synthesis, and evidence that shows understanding.

Which parts of the work may be delegated, shared, or protected?

Human–AI Responsibility Map

The boundaries depend on the learning outcome: some work may be delegated, some shared, and some must remain with the learner.

- Clarify the role of AI before the task begins
- Require disclosure where judgement is shared
- Protect the thinking the outcome is meant to develop



What may be delegated in one course may need protection in another.

Applying the Map: One Design Decision

Scenario: Students propose an intervention to reduce food waste on campus.

AI MAY CARRY	SHARED — WITH DISCLOSURE	STUDENT MUST CARRY
Formatting survey questions	Brainstorming interventions	Defining the problem
Suggesting categories	Generating stakeholder objections	Collecting or interpreting local evidence
Polishing the final report	Comparing communication strategies	Judging feasibility
		Selecting the intervention
		Addressing ethical implications
		Defending the recommendation

VISIBLE EVIDENCE

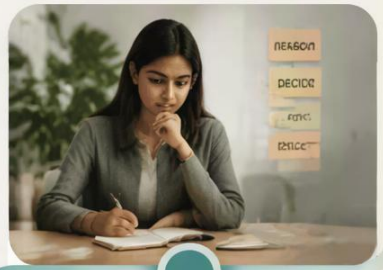
- Baseline problem statement before AI
- Source and field verification notes
- Option comparison table
- Decision memo
- Oral defence

Designing AI-Resilient Learning Activities

The goal is not to make learning impossible for AI, but to make the intended thinking difficult to bypass.

Start from the learning outcome

Identify the knowledge, skill, judgement, or disposition students must develop.



Protect the human thinking

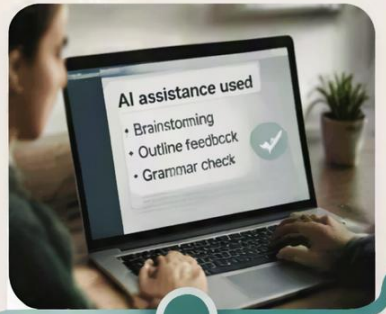
Name the reasoning, decisions, verification, or reflection that students must personally carry.

Assign AI a purposeful role

Define whether AI is a coach, critic, simulator, editor, or idea generator.

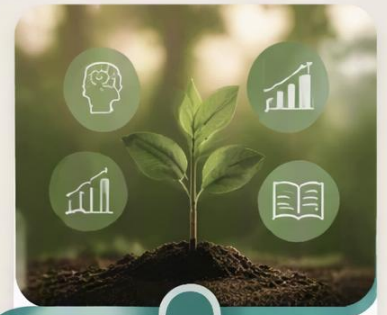
Build in verification

Require students to check important claims, sources, assumptions, and outputs.



Require proportionate disclosure

Ask students to explain meaningful AI use without turning disclosure into bureaucracy.



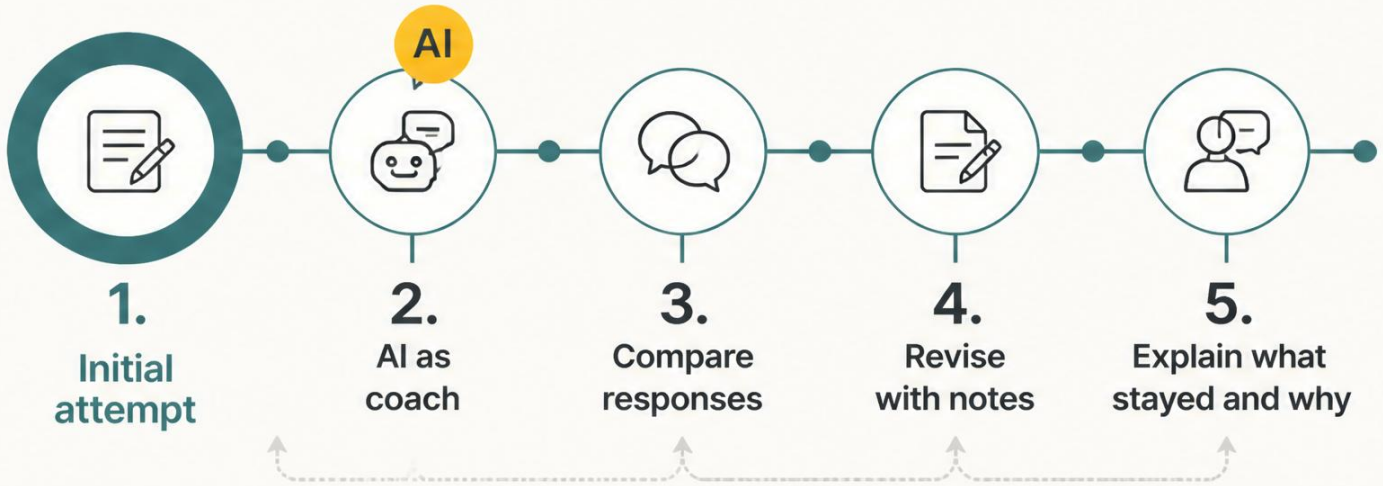
Design for meaningful learning

Reward evidence of judgement, revision, ownership, and transfer — not only a polished product.

AI resilience means aligning the task, evidence, and responsibility with the learning outcome.

Activity Pattern 1
Attempt Before AI

Students first produce their own thinking,
then use AI as a coach, critic, or alternative perspective.



Best for

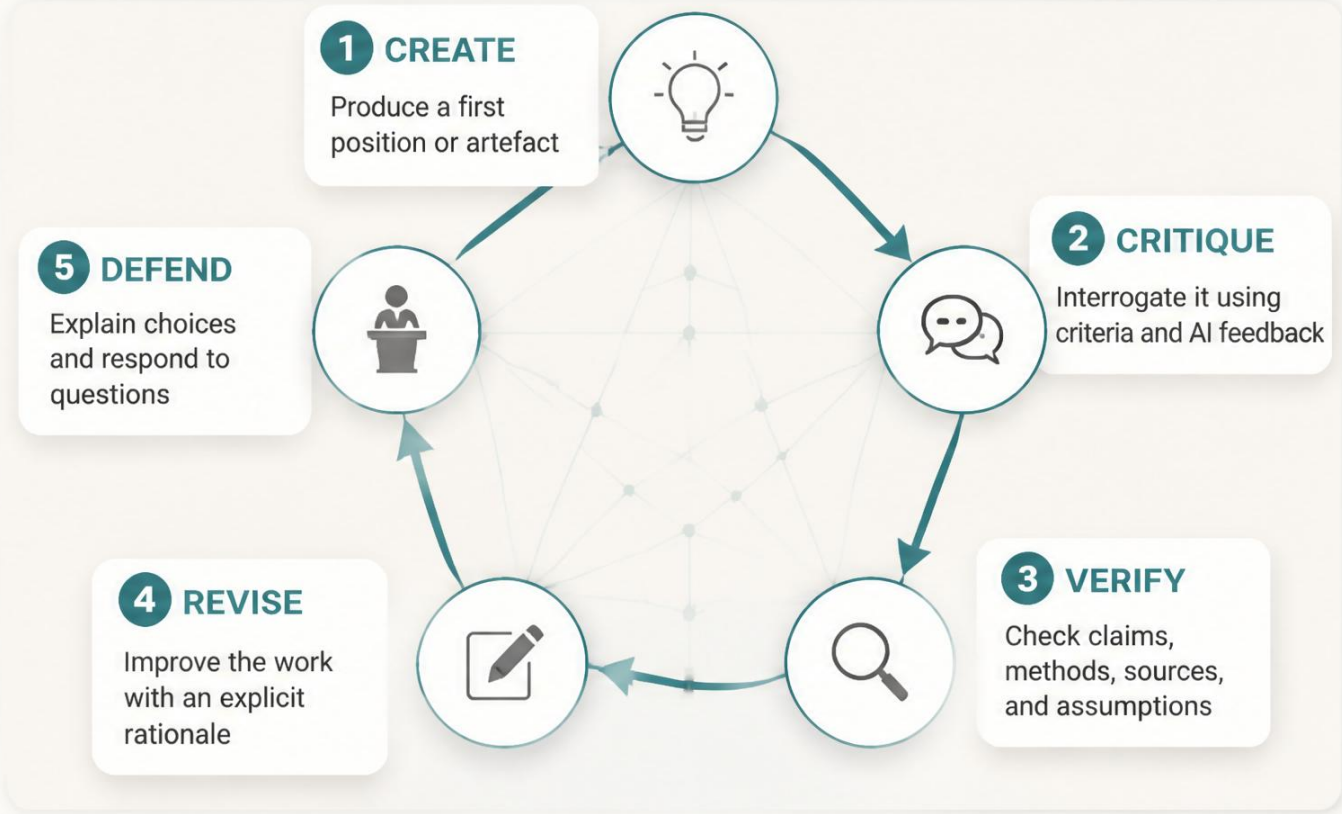
- conceptual understanding
- writing
- problem solving
- design ideation

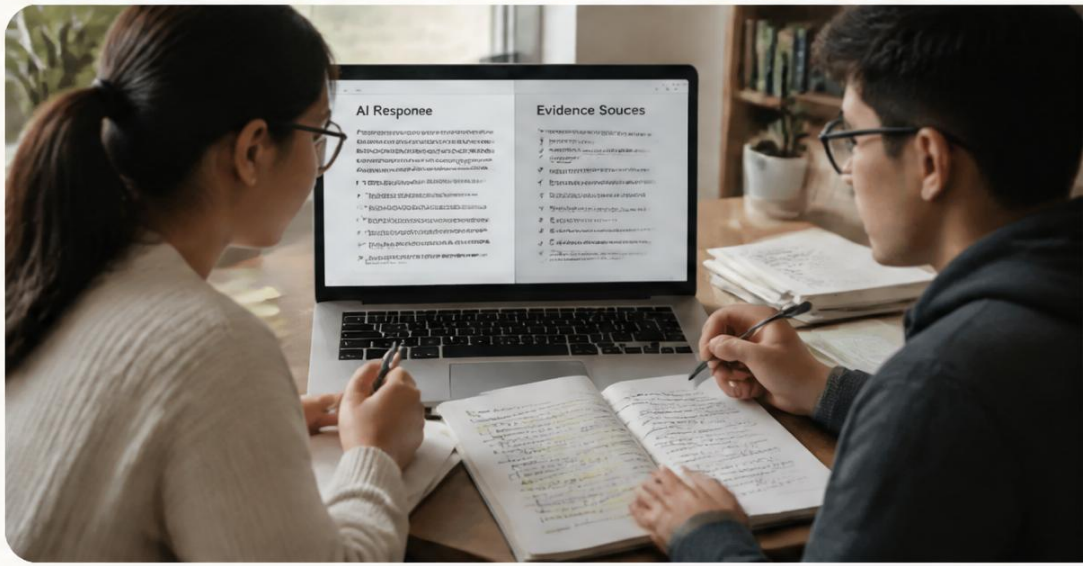
Visible evidence

- initial attempt
- comparison notes
- annotated revision

ACTIVITY PATTERN 2: CREATE, CRITIQUE, VERIFY, REVISE, DEFEND.

A five-stage workflow that keeps student judgement visible.





The final product matters, but the learning resides in the **transitions between stages.**

Activity Patterns Educators Can Reuse

Each pattern converts AI use into an occasion for judgement.

PATTERN LIBRARY

1. Critique the AI

Find weaknesses, omissions, bias, unsupported claims, or poor assumptions.

2. Compare and Judge

Evaluate human and AI responses against explicit criteria.

3. Verify Against the World

Check outputs against data, observation, policy, practice, or primary sources.

4. AI as Simulator

Practise cases, stakeholder responses, conversations, and changing conditions.

5. Decision Memo

Record alternatives, criteria, trade-offs, and the rationale for a choice.

6. Teach Back and Defend

Explain the concept or solution without relying on generated text.

Design move:
shift students from accepting outputs to testing, choosing, revising, and defending them.

04 SAMR and AI-Integrated Learning Design

Is AI merely improving production—or changing what and how students learn?

A design lens for deciding whether AI changes the task, the evidence, or the learning itself.

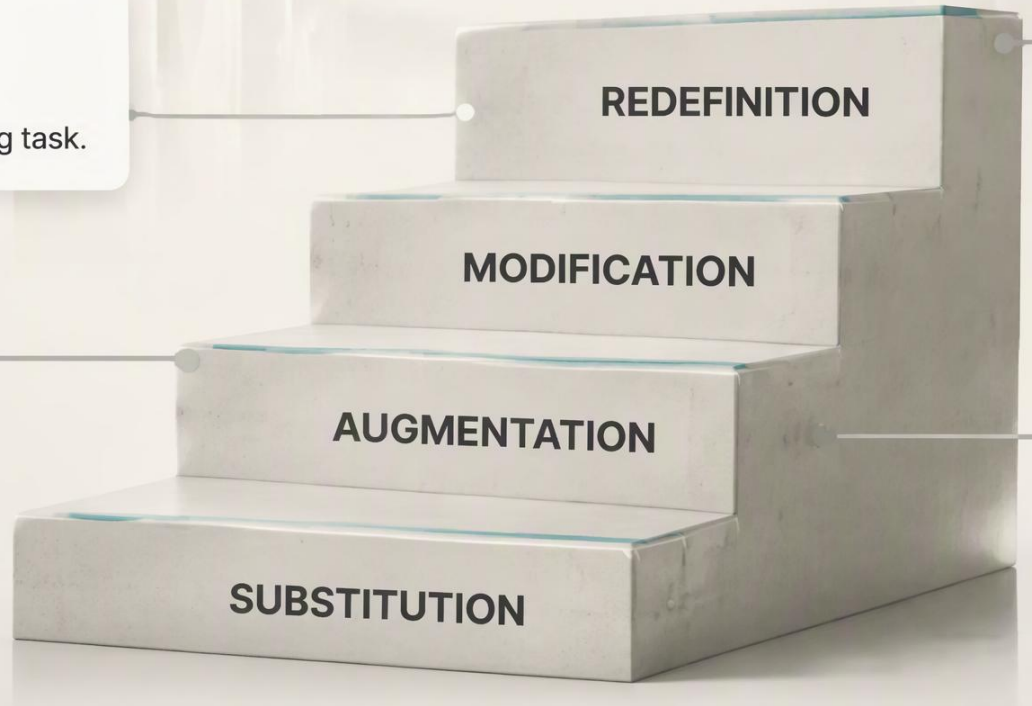
Substitution › **Augmentation** › **Modification** › **Redefinition**

The SAMR Ladder

AI-integrated learning design lens

Modification
AI enables significant redesign of the learning task.

Augmentation
AI replaces a tool with useful functional improvement.



Redefinition
AI enables a learning task previously difficult or impractical.

Substitution
AI replaces an existing tool with no meaningful functional change.

Production efficiency → Learning-task transformation

Redefinition is not always the goal.
The best SAMR level is the one that supports the learning outcome.

COURSE CONTEXT

Sustainable Campus Development

Course Setting

- Interdisciplinary undergraduate course
- Campus sustainability as the living laboratory
- Students work with evidence, stakeholders, and trade-offs

Learning Outcome

Evaluate evidence, stakeholder needs, trade-offs, and feasibility to recommend and defend a campus sustainability intervention.

Same task, four redesign levels.

Substitution — Augmentation — Modification — Redefinition

Common Task

Develop a proposal to reduce campus food waste.

Protected Human Thinking

- Problem framing
- Evidence appraisal
- Stakeholder judgement
- Trade-off analysis
- Decision and defence

SAMR: Substitution

AI-assisted language editing without changing the core learning task

Level 1 — Substitution

ACTIVITY DESIGN

Students use AI-assisted language editing after writing their own proposal draft.

The task remains essentially the same: improve clarity and presentation.

AI ROLE

- **Clarify wording**
- **Correct language**
- **Suggest concise phrasing**

THINKING MADE VISIBLE

- **Submit the pre-AI draft**
- **Mark accepted and rejected edits**
- **Explain two improved changes and one rejected suggestion**

Design judgement

The learning task is substantially unchanged.

This is appropriate when the outcome is disciplinary reasoning, not language accuracy.

SAMR Augmentation

AI expands stakeholder perspective, but students still verify and decide.

Activity Design

After an initial proposal, students ask AI to generate likely challenge questions.

Stakeholder Perspectives

Facilities management · Students · Food vendors

AI Role

Expand perspectives, generate challenge questions, identify possible omissions.

Augmentation

Useful functional improvement.

Student Verification

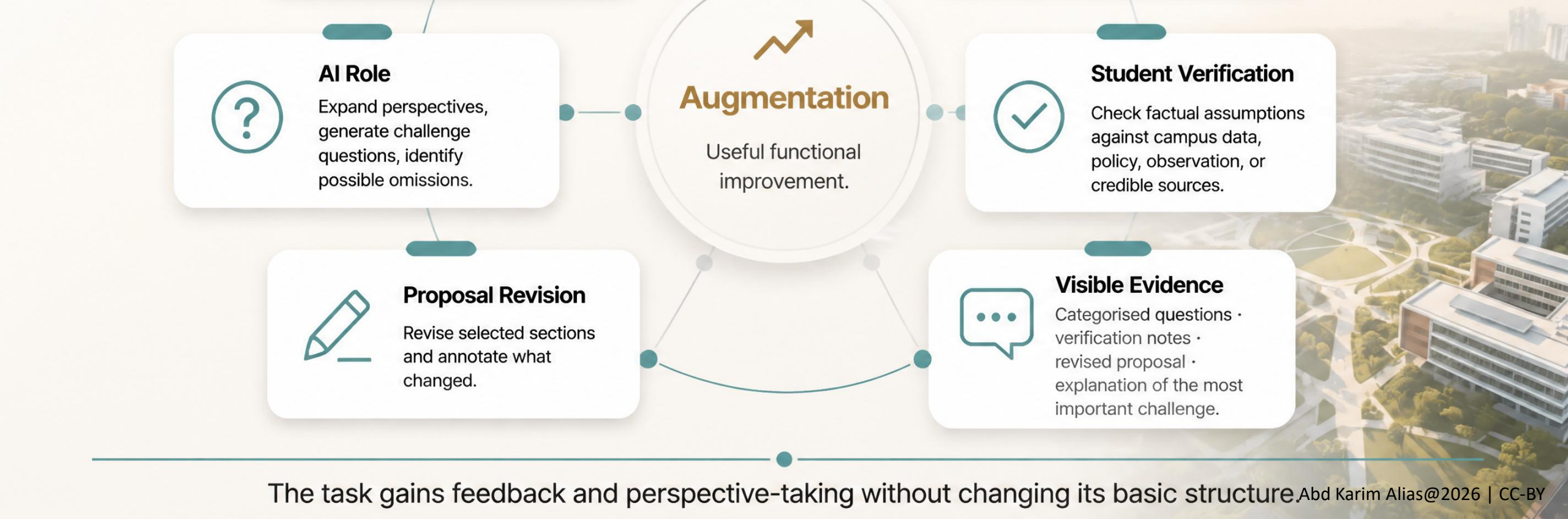
Check factual assumptions against campus data, policy, observation, or credible sources.

Proposal Revision

Revise selected sections and annotate what changed.

Visible Evidence

Categorised questions · verification notes · revised proposal · explanation of the most important challenge.



The task gains feedback and perspective-taking without changing its basic structure.

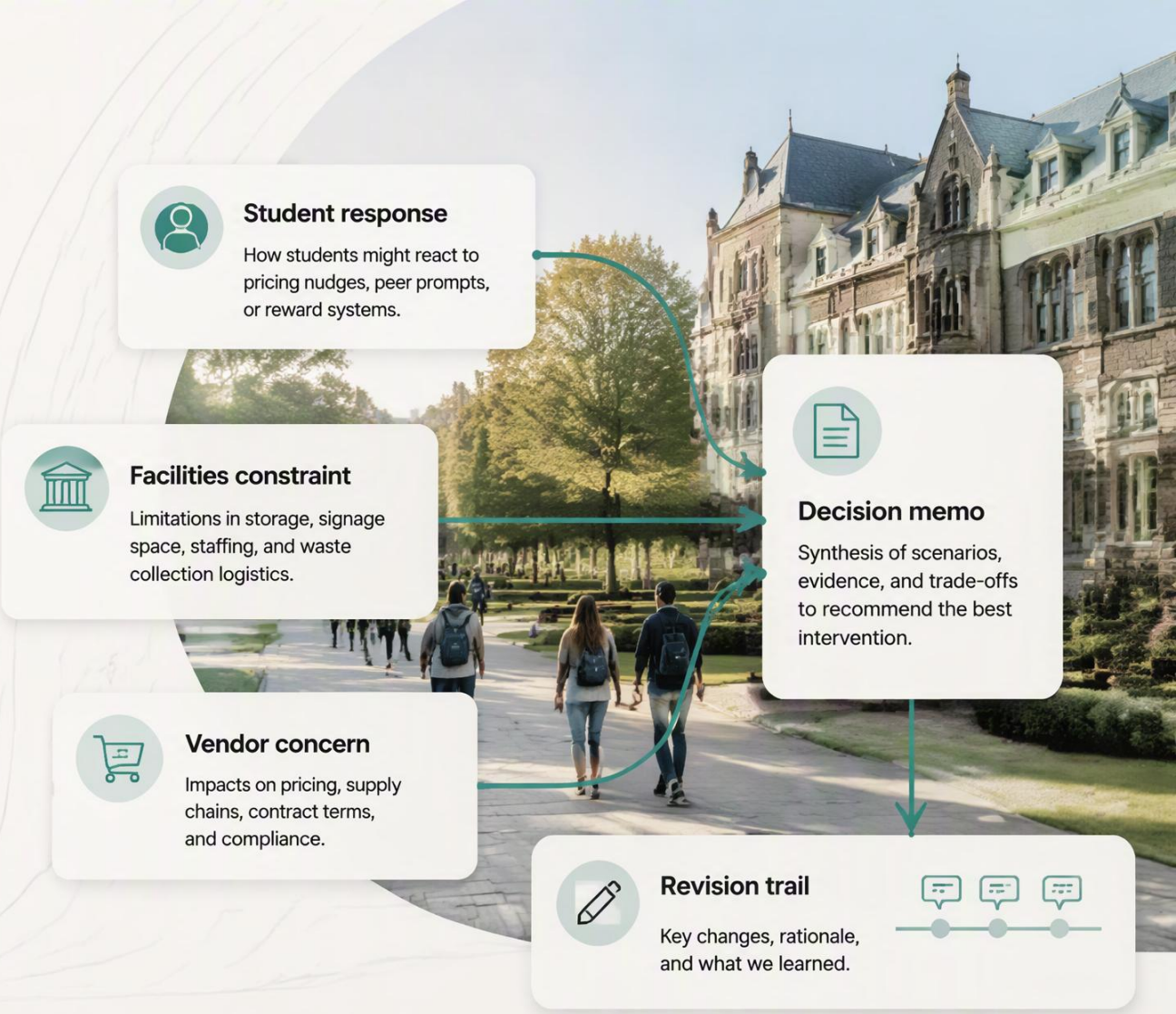
SAMR: Modification

Activity design: Students test three food-waste intervention options through AI-generated stakeholder scenarios, then compare those scenarios with local evidence and real constraints.

AI role: Simulates stakeholder responses, generates counterarguments, surfaces possible consequences, and stress-tests assumptions.

Thinking made visible: Option comparison matrix; verification against campus data, observation, or interviews; assumption register; decision memo; annotated revision trail.

Design judgement: The task is significantly redesigned around iterative critique, verification, and decision-making.



Substitution
Technology acts as a direct tool substitute, with no functional change.

Augmentation
Technology acts as a direct tool substitute, with functional improvement.

Modification
Significant redesign of the learning task.

Redefinition
Technology allows for the creation of new tasks, previously inconceivable.

SAMR Redefinition

AI enables a dynamic stakeholder hearing that would be difficult to rehearse repeatedly without simulation.

Dynamic simulation

AI plays evolving stakeholder roles, introduces new constraints, and challenges the team's proposal.

Real-time response

Students must justify evidence, trade-offs, feasibility, and consequences under questioning.

Visible evidence

Response log, team decision record, post-hearing revision, individual oral defence.

Design judgement: AI makes complex stakeholder negotiation scalable, but students still carry the reasoning.

SAMR Comparison Transformation Is Not the Same as Learning

Judge the design by alignment with the learning outcome, not by novelty.

	AI role	Protected thinking	Visible evidence	Design value	Design risk
Substitution	Language polish and routine editing	Original disciplinary reasoning	Pre-AI draft, accepted/ rejected edits	Improves clarity without changing the task	Students may mistake polish for understanding
Augmentation	Feedback, questions, alternative perspectives	Relevance judgement and revision choices	Categorised AI questions, verified assumptions	Adds useful critique and perspective-taking	AI feedback may be accepted too easily
Modification	Scenario testing and iterative critique	Trade-off analysis, evidence appraisal, decision-making	Option matrix, assumption register, decision memo	Redesigns the task around judgement	Process evidence can become too burdensome
Redefinition	Dynamic simulation and evolving constraints	Response under pressure, defence, adaptation	Response log, team decisions, oral defence	Enabies complex rehearsal at scale	Novel experience may distract from intended outcomes

Higher is not automatically better.

Efficiency can still be shallow.

Simple exɟeigns can protect deep thinking.

05 Assessment Redesign

Task

Process

Evidence

Confidence

What evidence provides confidence that genuine learning has occurred?

Design shift

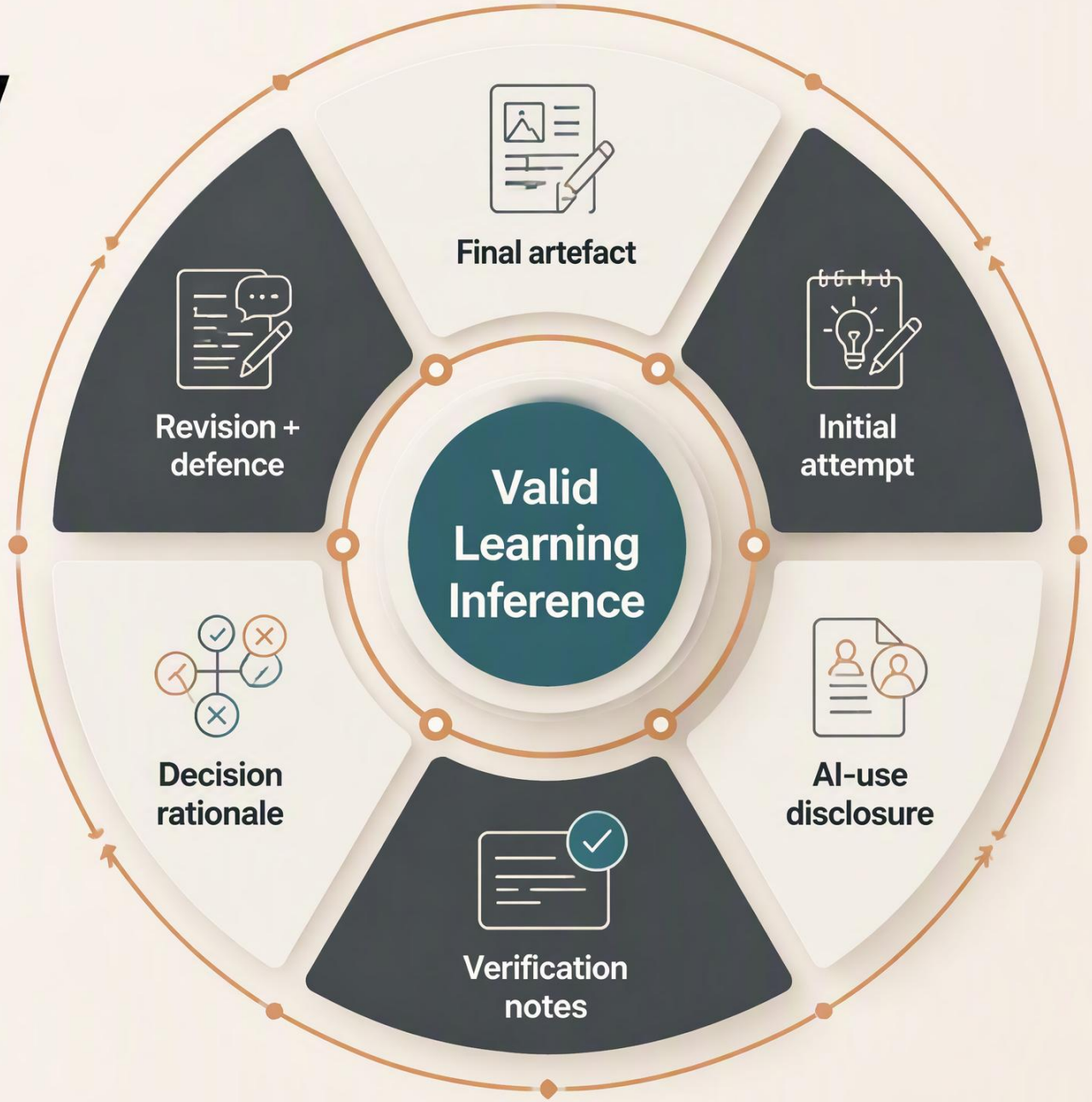
Final product
+ process evidence
+ student explanation

Assessment must reveal not only what students produced, but how they framed, verified, revised, and defended their work.

From Final Product Only to Product Plus Process Evidence

- A final artefact shows what was submitted.
- Process evidence shows how the work was framed, tested, revised, and defended.
- Together, they strengthen the validity of learning judgements.

Assessment becomes stronger when the pathway to the product is visible.



Assessment Vulnerability Test

A five-question diagnostic for spotting where AI could bypass the thinking your assessment is meant to develop.

	QUESTION	VULNERABILITY SIGNAL
1	**Can AI produce a polished answer without the student first showing their own attempt?**	**Process is hidden**
2	Does the task **reward surface quality more than reasoning, judgement, or verification?**	**Polish outruns thinking**
3	Is the final submission the only evidence used to infer learning?	**Evidence is too thin**
4	**Can students accept AI suggestions without explaining what they checked, rejected, or changed?**	**Decisions are invisible**
5	**Would the student struggle to defend the work through questioning, transfer, or teach-back?**	**Ownership is uncertain**

If several answers are "yes"

add visible process evidence

If the outcome requires judgement

protect the human decision points

If AI is allowed

require proportionate disclosure and verification

Sample Rubric
Assess the Thinking, Not Only the Polish

Use the final product as one source of evidence — then assess the reasoning that produced, tested, revised, and defended it.

	Emerging	Developing	Demonstrating
Reasoning	Claim is stated, but reasoning is thin or mostly borrowed.	Explains key choices with some links to concepts or evidence.	Builds a clear, defensible line of reasoning from problem to decision.
Judgement	Accepts suggestions or sources with limited evaluation.	Compares options and notices some limitations.	Weighs alternatives against explicit criteria and justifies trade-offs.
Verification	Few checks; relies on untested outputs or general claims.	Checks important claims against credible sources.	Documents what was verified, how it was checked, and what changed.
Revision	Edits mainly for polish or completion.	Revises selected sections in response to feedback or evidence.	Shows how feedback, verification, and reflection improved the work.
Defence	Describes the product but struggles to explain decisions.	Answers questions with partial rationale.	Explains, questions, corrects, and defends the work without relying on generated text.

Rubric principle: reward visible thinking — not only fluent presentation.

Green, Amber and Red AI-Use Rules

Link permission to the learning outcome, not to the tool.

GREEN — AI MAY CARRY

Permitted when AI does not replace the intended thinking.

- formatting
- transcription
- language polish
- routine conversion
- practice examples
- accessibility support

AMBER — DISCLOSE + SHOW EVIDENCE

Allowed when judgement, verification, and decisions remain visible.

- brainstorming
- draft feedback
- alternative explanations
- counterarguments
- **summaries of student-provided material**
- scenario exploration

Evidence: AI-use log · verification notes · decision memo

RED — STUDENT MUST CARRY

Not allowed when AI substitutes for the learning outcome.

- final argument without defence
- unverified sources
- fabricated citations
- hidden AI authorship
- delegated judgement
- **work the student cannot explain**

Rule of thumb: if the outcome requires framing, judging, verifying, deciding, or defending, the student must remain answerable.

Practical Redesign Workflow and Workshop Audit

Audit one existing assessment, protect the required human thinking, and make AI use transparent.

1. **Choose one assessment**
2. **Name the intended learning outcome**
3. **Identify the protected human thinking**
4. **Run the AI vulnerability test**
5. **Map responsibility: AI may carry / shared with disclosure / student must carry**
6. **Select visible evidence of process**
7. **Add an AI-use declaration**
8. **Pilot, collect feedback, and revise**

Workshop Audit Canvas

Assessment being redesigned	
Learning outcome	
Thinking students must carry	
Permitted AI role	AI may carry / Shared with disclosure / Student must carry
Required process evidence	
Declaration prompt	

Redesign begins with one assessment, one outcome, and one protected act of thinking.

MOVE BEYOND DETECTION REDESIGN FOR VISIBLE THINKING

Design one course, one learning activity, and one assessment so AI supports the work while students own the thinking.

Protected human thinking

Frame • Judge • Verify • Decide • Defend

Visible Thinking Blueprint

01 Course

Name the thinking the outcome requires.

02 Activity

Make judgement, verification, and revision visible.

03 Assessment

Collect evidence of process, not only product.

AI may support

Draft feedback • Alternatives • Practice • Clarity

Learning evidence

Initial attempt • AI-use log • Decision memo • Oral defence

The question is not whether students use AI. The question is whether AI replaces the **thinking** the course is meant to develop.

About the Author

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